ABSTRACT

Title of Document:	THE EFFECT OF GOAL DISTANCE ON GOAL VALUE AND ESCALATION OF COMMITMENT
	Hsuchi Ting, Doctor of Philosophy, 2009
Directed By:	Dr. Thomas S. Wallsten, Department of Psychology

Escalation of commitment describes individuals' tendencies to persist in a chosen course of action. The traditional account of escalation of commitment assumes that sunk cost is the primary antecedent for this behavior. However, it has been noted that high sunk costs are confounded with progress made toward a goal and hidden payoff information. Thus, the apparent escalation tendency may be a consequence of goal proximity and information search rather than of sunk costs. Experiments 1 and 2 show that individuals' tendencies to escalate reflect the classical goal-gradient effect after controlling for the sunk costs. Moreover, Experiment 1 also shows that controlling for progress toward the goal, increased sunk costs decreases escalation. In addition, Experiment 2 shows that individuals attribute more value to the goal as they get closer to it, thus providing an alternative explanation for escalation of commitment. Experiments 3a and 3b demonstrate that individuals committed to a course also devalue other course of actions

not chosen. These results suggest a new interpretation for escalation of commitment and new approaches to guiding people to avoid it.

THE EFFECT OF GOAL DISTANCE ON GOAL VALUE AND ESCALATION
OF COMMITMENT

By

Hsuchi Ting

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2009

Advisory Committee:
Professor Thomas S. Wallsten, Chair
Associate Professor Michael R. Dougherty
Professor Michele J. Gelfand
Professor Paul J. Hanges
Associate Professor Rebecca K. Ratner

Acknowledgements

There was once a student in school
He wrote a paper that was cool
    But committee said no
    He was ask'd to re-do
I am not going to spend time finishing this because I need to write

I would like to thank my committee members, Drs. Michael Dougherty, Michele Gelfand, Paul Hanges, Rebecca Ratner, and Tom Wallsten for their comments and feedback. Without them, this dissertation would not be nearly as good. The final product is unfortunately unable to reflect all their deep insights and considerations.

I am also indebted to my RAs, Marissa Lewis, Hershel Sy, Stephanie Odenheimer, Leda Kaveh, and Josh Boker for their hard work and dedication. Many thanks.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Escalation of commitment is the phenomenon of individuals pouring additional resources into a course of action in which they have already invested in pursuit of their goal (Staw, 1981; 1997). For example, individuals tended to overbid as they spend more time bidding (Ku, Galinsky, & Murnighan, 2006; Ku, Malhotra, & Murnighan, 2005). In the most extreme case, individuals who have been bidding for a dollar often offer more than a dollar (Teager, 1980). The traditional account of escalation of commitment assumes that sunk cost is the primary antecedent for escalation of commitment (e.g., Arkes & Blumer, 1985; Arkes & Ayton, 1999; Garland, 1990; Garland & Newport, 1991; Staw, 1981, 1997). Such behavior is considered economically irrational because decisions should be made based upon the expected benefits and costs of each incremental investment, not on how much has been invested in the past.

Various theories exist to explain the robust link between sunk costs and escalation of commitment. Some prominent ones include self-justification (Brockner, 1992), personal responsibility (Staw, 1976), reluctance to appear wasteful (Arkes & Blumer, 1985), and self-efficacy (Whyte, Saks, & Hook, 1997; Singer & Singer, 1986). These accounts rely on cognitive dissonance theory in that abandoning past investments would force individuals to admit that they made their decisions in error, thus creating a psychological feeling of discomfort (Festinger, 1957; Staw, Barsade, & Koput, 1995). According to this account, to reduce this feeling, the person unconsciously justifies or rationalizes the prior decision and in essence concludes it was justified. Therefore, when a decision-maker has chosen a course of action that later becomes undesirable, the decision-maker will defend the prior decision by continuing to invest in the same course

instead of withdrawing from it, resulting in escalation of commitment. The cognitive dissonance perspective is retrospective in that individuals are presumed to escalate their commitment in order to justify sunk costs they have accrued in the past.

<center>The Role of Sunk Costs in Escalation of Commitment</center>

Recently, the robust link between sunk costs and escalation has since been doubted. Zikmund-Fisher (2004) and McCain (1986) found that individuals showed that an increase in sunk costs engendered a greater tendency to quit, contrary to the sunk costs account. The proponents of the project-completion hypothesis suggested that the robust link between sunk costs and escalation is due to the natural confound between sunk costs and distance from the goal, in that in the absence of information on goal distance, individuals interpret higher sunk costs as indicating decreased distance from the goal, driving individuals to focus on goal completion rather than making economic calculations (Boehne & Paese, 2000; Brockner, Shaw, & Rubin, 1979; Conlon & Garland, 1993; Garland & Conlon, 1998). This change in focus causes individuals to disregard both economic rationality and sunk costs. They further noted that individuals ignored sunk costs when they had information about their progress toward the goal, and that higher levels of sunk costs did not increase individuals' tendencies to escalate if they knew they had made no progress.

Under the project-completion theory, proximity to completion determines individuals' decisions to escalate commitment and sunk cost magnitude has no effect because individuals ignore economic consequences and focus only on project completion. To test the hypothesis, Boehne and Paese (2000) conducted a series of experiment in which the participants faced an investment scenario that entailed either low or high sunk

cost in a project that was either 10% or 90% complete. The results showed that participants were willing to make additional investment in the project if it was 90% complete, but not if it was 10% complete, while the level of sunk costs had no effect. The project-completion hypothesis is a prospective account of escalation, based on goal attainment and distance to completion, in contrast to the retrospective account based on actions taken in the past. In short, the project-completion hypothesis posits that sunk cost creates escalation only when information on goal progress is hidden, and this relationship disappears once the information on progress is revealed.

There is also the question of whether escalation of commitment is irrational. Prior research that shows a robust relationship between sunk costs and escalation fails to control many factors, such as economic consequence of escalation. Clearly, escalation of commitment cannot be regarded as irrational decision-making when information on goal distance and the potential payoff of escalation are opaque. Some researchers have found when such information is hidden, individuals escalated due to the need for reducing the uncertainty and ambiguity of investing (Kernan & Lord, 1988). Heath (1995) demonstrated that participants withdrew more quickly if they could track the total amount of sunk costs and payoffs. The author found that individuals withdrew from their chosen course of action more often when potential benefits were revealed than when they were not. They assumed that individuals treated the explicit information on the potential benefits of additional investments as mental accounts. According to the mental accounting framework, individuals avoid over-consumption by setting aside a pre-determined level of spending (Heath & Soll, 1996; Thaler, 1985), and the potential payoff serves as the budget for spending. Individuals were found to be more willing stop

escalating when sunk costs threatened to surpass the expected payoff. Since high sunk costs depleted the mental account more quickly than low sunk costs do, commitment escalation was more pronounced when sunk costs are low. In summary, as more information about the progress and benefits are revealed, individuals showed a greater tendency to withdraw from their chosen course of action as sunk costs increased (Kernan & Lord, 1988; McCain, 1986; Zikmund-Fisher, 2004). In addition, Heath (1995, Experiment 3) showed that higher sunk costs only led to higher irrational escalation tendency when the information on expected payoff on goal completion was omitted. The author showed that participants assumed the amount they invested would lead to higher payoff when information on the potential payoff for attaining the goal is missing, an argument similar to those raised by the proponents of project-completion hypothesis in that individuals interpreted high sunk costs as greater proximity to the goal.

Taken together, past research suggests that the robust link between sunk costs and escalation can be explained by information search and there is little evidence to suggest that escalation in the face of sunk costs is irrational. This present a serious issue to escalation research as the most compelling examples of escalation comes from studies in which subjects are presented with vignettes describing an investment project without information on progress toward completion and potential payoffs. Interpreting individuals' tendencies to irrationally escalate based on their willingness to invest may be problematic because participants are more optimistic and perceive higher marginal benefits when firms or individuals invest a large amount, and hence should receive more payoff. For example, a commonly used investment scenario (Staw, 1976) had participants simulate the role of a vice president of a company called "Adam & Smith." Participants

were faced with the task of determining the allocation of financial resources for research and development. The company was structured into two main divisions, consumer products and industrial products. Half of the participants decided, by themselves, which division should receive a $10 million investment. The other half of the participants was informed that the previous vice president had already invested $10 million in one of the two divisions. Then, for all participants, the chosen division that received the investment was simulated to have poor performance for the next five years and needed additional funding. Staw (1976) showed that participants who made the decision to invest as a vice president invested more money in the failing division than did those who inherited the vice president position. This robust pattern has been replicated under different contexts (e.g., Bazerman, Giuliano, & Appelman, 1984). Additional research has shown that individuals who selected the division in which to invest gave a larger sum than those who did not chose, because they had a stronger preference for the division as indicated by their attributing more value to it (Schultz-Hardt, Thurow-Kroning, & Frey, 2009). Therefore, the lack of explicit payoff and cost information prevented researchers from determining whether investing additional resources into the same course of action is an irrational decision by examining the choice alone.

In addition to providing information on progress and potential payoffs, the consequence of each incremental investment must also be revealed so that decision-makers can judge the benefits of incremental investments and adjust their prior beliefs about their chance for success. Traditional scenario-based escalation research, such as the theater ticket and investment options, omitted such information and did not allow participants to make incremental investments, thereby preventing researchers from

determining whether escalation was irrational or due to a failure to readjust their prior beliefs given new information (Camerer & Weber, 1999). This omission might cause the divergent results on escalation research in which designs using repeated measures yielded de-escalation under high sunk costs while paradigms using one-investment period scenarios showed the opposite results (e.g., Garland, Sandefur, & Rogers, 1990; Heath, 1995).

<div align="center">Transparency of Sunk Costs</div>

Heath (1995) contended that escalation would ensue when sunk costs are hidden because individuals would not be able to track the total amount of expenditures in relation to the potential payoff, so the mental budget would never be breached. This leads to the possibility that sunk costs in terms of effort and time can create irrational escalation. However, Soman (2001) provided the only experimental evidence to show that time did not produce irrational escalation of commitment. The author argued that individuals rarely consider any non-monetary investments as costs, nor would they view potential payoff in terms of saved time and effort as benefits. Therefore, individuals saw little need to justify sunk costs invested in the past, which mitigated individuals' tendencies to escalate.

This pattern of results further suggests that sunk costs do not necessarily lead individuals to escalate commitment and the transparency of sunk costs does not change individuals' tendencies to escalate. The results also suggest that the past research that documents escalation of commitment do not extend to instances where sunk costs are opaque or presented in non-monetary forms. The current research seeks to document

instances when irrational escalation occurs, and provides a conceptual model to explain the underlying mechanism behind irrational escalation of commitment.

Current Research

Past research on escalation of commitment has not effectively shown that investing additional resources into the same course of action is irrational and evidence on the link between sunk costs and escalation of commitment is mixed. Escalation of commitment is defined as tendencies to focus on the past costs instead of future payoffs to justify additional investments, but past research on escalation fails to provide information on future payoffs. The purported escalation effect disappears in cases where future payoffs are transparent. To account for this pattern, proponents of the project-completion model posit that goal distance plays a critical role in irrational escalation because reduced goal distance draws attention to reaching the goal rather than receiving the economic consequences (Boehne & Paese, 2000; Brockner et al., 1979; Conlon & Garland, 1993; Garland & Conlon, 1998). However, because the potential payoff for completing the project and the saliency of the goal were not examined by the authors, the validity of the assumption is unknown. The link between goal proximity and escalation might be due to an individual's increasing confidence that the goal will be completed. When decision-makers first invest in a project, the probability of finishing it is low, but increases as distance from the goal decreases. He and Mittal (2007) has found that escalation tendency depends primarily on the need to gain information about the feasibility in completing the course of action and the need for such information reduces as participants progressed toward the completion of the project. Therefore, the link between escalation and goal distance observed in studies on project completion hypothesis could also be interpreted as

need for information search and confidence in completing the project, and cannot be interpreted as irrational decision-making.

The brief literature review therefore suggests that there is no direct relationship between sunk costs and escalation of commitment. The goal of the current research is to provide an alternative account to explain the underlying mechanism behind irrational escalation when sunk costs and economic consequence of escalation are either transparent or opaque. I rely on the classical goal-gradient hypothesis (Hull, 1932) to explain individuals' tendencies to escalate regardless of whether the payoffs and costs are explicit or hidden. The original goal-gradient hypothesis addressed the observation that an organism's speed of locomotion increases as it approaches the goal. This paper proposes that motivation for the goal increases as distance from it decreases because the decreased distance causes the goal to become more valuable to the individual relative to the costs or other objects or. In sharp contrasts to the sunk costs account, which posits that individuals have the tendency to escalate to recover what have been invested, the alternative account stipulates that irrational escalation is real, and that the antecedent for it to occur is based on how individuals value the chosen course of action.

In sum, individuals have a strong tendency to complete the project they have invested in, and are willing to escalate irrationally to do so according to the project-completion hypothesis. More important, results showed that this tendency was not from the level of sunk costs incurred from the past, but how close individuals are from its completion. I presume that the amount of resources individuals spend in their committed course would increase commensurate with the distance remaining from completing the project, consistent with the empirical relationship between motivational strength and goal

distance as described by the goal-gradient hypothesis. Based on this hypothesis, the paper aims to address mechanisms influencing individuals' decisions to irrationally escalate commitment by examining situations where resources into the same course action would yield no additional benefits. More important, it also seeks to address the relationship between the evaluation of the goal and individuals' tendencies to escalate commitment. Specifically, I hypothesize that the tendency to irrational escalate is not related to the amount of sunk cost, but rather is captured by the classical empirical relationship between goal proximity and motivation known as the goal-gradient hypothesis.

Research on goal has shown that as the task completion is closer, the desirability of its completion increases, and task completion has its own implicit satisfaction, the imminent closure of interim objectives takes oh a motive force that may augment or supplement the original motive strength embodied within the final task or project (Atkinson & Birch, 1974; Atkinson & Cartwright, 1964). It appears that irrational escalation should be captured by the motivation to complete the project. In addition, classical theories on human motivation support this contention. Dynamics model of motivation posits that the drive for task closure increases as the goal is approached (Atkinson, 1957; Lewin, 1935). According to Lewin (1935), the need to complete a task functions much like biological needs in that individuals sought to reduce them. The need also increases as the its completion gets closer, which in turn influences the construction of preference formation by changing the values individuals placed on the object's instrumentality in satisfying those needs (McClelland, 1961). Individuals are therefore more inclined to invest in a course of action as the potential closure of the task draws near and irrational escalation might be related to the need to close the incomplete task.

The closer the task completion should cause higher need, thereby driving individuals to irrationally escalate.

More current theories such the cybernetic control model asserts that individuals have positive affect when their rate of progress toward the goal surpasses a self-generated criterion, which motivates them to exert additional effort into the same goal (Carver & Scheier, 1990). Heath, Larrick, and Wu (1999) propose that the pattern in which individuals showed a greater tendency to expend effort as the goal nears is a result of the diminishing sensitivity of prospect theory's value function. Recently, Kivetz, Urminsky, & Zheng (2006) demonstrated that the increase in motivation due to goal proximity could be translated into various consumer behaviors. When a reward was contingent on the number of purchases, customers made more purchases, became more loyal to a brand, and accelerated the purchasing frequency, as they came near the bonus reward. The pattern showed that customers were more likely to reengage in the same course of action (behavior) in order to attain the reward. Finally, the project-completion hypothesis provides some support that the drive to complete the goal displaced economic concerns and propel individuals to escalate as they move closer to the goal.

In summary, this paper proposes an alternative explanation for escalation of commitment when costs and payoffs are either opaque or transparent. Instead of relying on the sunk costs account, I contend that individuals' tendencies to escalate depend on the subjective value of the project that is influenced by the distance from completing the project. Experiment 1 tests this hypothesis when all economic information is revealed to the decision-makers.

Chapter 2: Experiment 1

Prior research has shown that the escalation tendency disappears when payoffs and progress from the goal are transparent to the decision-makers. Experiment 1 tests the hypothesis that, despite transparent information on payoffs and progress, as individuals make greater progress toward the goal, they will spend an increasing amount of resources to complete the goal, independent of the level of sunk costs. Experiment 1 also aims to show that the level of expenditure moves beyond what is economically rational, despite the fact that the economic consequences and goal progress are apparent to the decision-makers.

Participants in Experiment 1 chose whether to draw a ball from a bingo cage in order to draw ball number 1 (henceforth the "winning ball" – WB), with which they could gain bonus experimental points. As will be explained below, draws usually, but not always were costly. Moreover, the paradigm was constructed such that the benefit of attaining the goal (i.e., drawing the WB) exceeded the cost of taking another draw only through the seventh costly draw, after which it was irrational to continue. The primary dependent variable, reflecting level of commitment escalation, was the number of times participants paid to draw a ball from the cage (i.e., the number of "costly draws"). A secondary dependent variable was the proportion of trials on which participants irrationally took more than seven costly draws given the opportunity to do so.

Method

Participants. One hundred eighty-six undergraduates from University of Maryland participated in this study in exchange for course credit.

Design and Procedure. Participants began the experiment with 5,000 experimental points, which carried no monetary values in that points earned and lost in the experiment could not be exchanged for money.[1] The study was a 2 (free draws: 5 vs. 0) x 2 (sunk costs: high vs. low) x 30 (trials) mixed design with repeated measure on the last factor. There were 30 trials in the study and participants could win experimental points on each trial. On each trial, participants had up to 10 chances to pay experimental points to draw balls from the bingo cage in an attempt to draw the WB for a payoff.

The number of free draws was manipulated by the number of balls in the bingo cage at the beginning of each trial. Participants in the 0-free condition began their trials with 10 balls in the bingo cage whereas those in the 5-free condition began with 15 balls, but could drew the first five balls for free. After free draws were exhausted, each subsequent draw became costly in that participants had to pay experimental points in order to take it.

The charge for drawing costly balls was greater in the high than the low sunk cost condition. The costs were set such that in the high sunk cost condition, the marginal return of the first costly draw was 130% of the marginal cost. The marginal return decreased by five percentage points per draw thereafter through the seventh costly draw. In the low sunk cost condition, the marginal return was 340% of the marginal cost on the first draw, and decreased by 40 percentage points per draw thereafter through the seventh costly draw. The decrease in marginal return in both conditions was such that on that

---

[1] As Heath (1995) has noted, an initial endowment may engender the "house money effect" and create a greater risk-taking behavior (Thaler & Johnson, 1990). However, our main interest is in the difference of the degree of escalation between conditions, and not in individuals' decisions to escalate.

draw, the marginal return in both high and low sunk costs condition was 98% of the marginal cost. The marginal return decreased by an additional two percentage points thereafter, making additional costly draws beyond the seventh economically irrational. The total cost paid to the experimenter also surpassed the total amount of payoff that could be won in the final three costly draws.

Figure 1 provides an example of low sunk costs condition. On the first costly draw, the cost for drawing the first bingo ball out of the cage cost 38 experimental points. The marginal return for making the first costly draw was 50 points (.10 x 500), the marginal return was therefore approximately 130% of the marginal cost (50/38 = 1.31). In contrast, those in the low sunk costs condition could draw the first costly ball by paying only 15 experimental points. Because the cost for drawing a bingo ball was always lower in the low sunk costs condition, individuals would invest fewer points to draw the WB out of the bingo cage in the low, compared to the high, sunk costs condition. But because the cost of a draw increased (marginal return decreased) at a faster rate, the point of economic irrationality was reached at the same point.

The order of the 30 trials was determined by a deck of 30 cards, which each showed the cost of successive costly draws from the bingo cage and the payoff for drawing the WB for that trial. The cards were shuffled in front the participants to ensure that they knew the costs and payoffs were in random order. For each trial, participants chose sequentially whether to pay for the next draw or to stop. If they chose to draw and the WB was drawn, then they received experimental points; otherwise, they decided whether to purchase another draw. The balls were not replaced. A trial ended and the next one began when either the WB was drawn or the participant decided to stop drawing balls.

Before each drawing of the bingo ball, the experimenter showed the participant the total cost incurred up to that point on that trial. The experimenter calculated and showed the gain (or loss) to participants when a trial ended.

Results

The dependent measure is the average number of costly draws across all trials in which participants either stopped voluntarily or exhausted every bingo ball in the cage. We ignored the event-terminated trials (i.e., when trials were terminated due to the drawing of the winning ball) in our analysis, as they underestimate the participants' intentions. We call this variable the *adjusted number of costly draw.*,[2] In addition, seven participants were excluded from data analysis (five from the 5- and two from the 0-free-balls condition), two because they refused to purchase any draws and five because they won the WB on every trial.

Tendencies to make additional investments. The adjusted number of costly draws provides a measure of the general degree of escalation. A 2 (free draws: 0 vs. 5) x 2 (sunk costs: high vs. low) between-group ANOVA with the mean number of draws as the dependent variable showed very similar results as those obtained from the mixed

---

[2] Even this adjusted number underestimates the dependent measure that is of ideal interest, which is the unobservable number of costly draws participants would have taken ended all trials voluntarily, although the extent of underestimation is far less than would be the case if those trials were included (see Pleskac, Wallsten, & Lejuez, 2008). However, because our concern is with differences in the degree of escalation between conditions, not in the absolute values of individual's decisions, the conclusions in this paper are unaffected by the possible measurement issue.

ANOVA, which included trials as a within-subject variable, so I report only the simpler analysis. There was a significant main effect due to number of free draws, $F(1, 175) = 5.12$, $p < .03$, $\eta^2 = .03$. As predicted by our hypotheses, participants in the 5-free condition drew more costly bingo balls ($M = 5.32$) than those in the 0- free condition ($M = 4.75$). Contrary to the goal-substitution hypothesis, the sunk costs condition was significant, $F(1, 175) = 4.45$, $p < .04$, $\eta^2 = .03$, where participants in the low sunk costs condition persisted with costly draws longer on average ($M = 5.30$) than those in the high sunk costs condition ($M = 4.80$).[3] The interaction was not significant.

A discrete-time survival analysis with dummy trial variables to account for the time-varying heterogeneity and dependency across the 30 trials that could have affected an individual's decision to quit yielded significant effects on number of costly draws due to the number of prior free draws, $\beta = -2.36$, $SE = .22$, $p < .001$, evidencing that the initial free draws increased the willingness to accept higher amount of costs necessary to draw the WB. Consistent with the ANOVA results, the level of sunk costs, $\beta = -3.10$, $SE = .26$,

---

[3] According to the mental accounting framework, individuals avoid over-consumption by setting aside resources for different goals (Heath & Soll, 1996; Thaler, 1985). Since high sunk costs deplete the mental account more quickly than low sunk costs do, commitment escalation should be more pronounced when sunk costs are low. Heath (Experiment 2, 1995) first demonstrated this effect in that participants withdrew more quickly when their mental account was depleted more rapidly by high sunk costs. The ANOVA results in this paper were consistent with the findings reported in Heath (1995).

$p < .001$, was also significant, indicating that the high, rather than low, sunk costs condition reduced the likelihood that the participants would irrationally escalate.

Likelihood of irrationally investing additional resources. To examine whether individuals were more likely to escalate irrationally when they have completed a greater proportion of the goal, we created a new dependent variable that took on the value of 1 on trials that continued (irrationally) beyond the fourth from the last ball in the cage, and 0 otherwise. All trials were included in this analysis, except for the two participants who refused to draw any costly balls from the bingo cage throughout the experiment. We used Generalized Estimating Equations (GEE; Hardin & Hilbe, 2002) and entered both sunk costs and number of free draws as predictors. The only significant effect on decisions to continue drawing from the cage when three balls were remaining was 0 versus 5 balls in the cage, $\beta = .51$, $SE = .21$, $p < .02$.

Discussion

Experiment 1 distinguished an individual's decision to make additional investments from his or her tendency to irrationally escalate despite knowledge of the true costs, payoffs, and the likelihood of attaining the winning ball (easily inferred from the number of balls remaining in the bingo cage). The results showed that only the number of balls in the cage had the effect on individuals' tendencies to irrationally escalate. The results are consistent with the claim that the tendency to escalate commitment is due to an increased motivational strength as predicted by the goal-gradient hypothesis. In the experiment, the costs in the 5-free draw and 0-free-draw conditions were identical; and were set such that it was rational to stop when only three balls remained in the cage, at which point the cost of drawing the next ball exceeded the potential expected winning. Participants in the 5-

16

free-draw condition took more costly draws and evidenced greater irrationality than did those in the 0-free-draw condition. Note that participants in the 5-free ball condition contemplating whether to draw their sixth ball and those in the 0-free ball condition contemplating whether to draw their first ball were in identical economic situations, and remained so on all subsequent trials. Psychologically, however, they were in very different positions having made different amounts of progress toward drawing the WB. Because participants in both conditions faced identical economic consequences, the results cannot be explained by post-decisional regret and cognitive dissonance.

Experiment 1 showed that individuals proportionally closer to drawing the WB were more likely to irrationally escalate compared to those who were proportionally farther from drawing it, despite the economic consequences and progress information being transparent. The next set of experiment aims to replicate the pattern observed in Experiment 1 when the amount of sunk costs is opaque. There are many tasks that do not involve investment and sunk costs are difficult to track (e.g., in the case of effort). Prior research suggests that individuals attribute more value to their chosen course of action when sunk costs and economic payoffs are opaque (Camerer & Weber, 1999; Schultz-Hardt et al., 2008), which suggests that the subjective value of the course underlies individuals' tendencies to escalate. In short, when project's potential payoffs and costs are opaque, the desirability of project completion should determine individuals' tendencies to escalate, which should be related to the value individuals attribute to the project.

Experiment 2 also aims to rule out the possibility that individuals in the 5-free ball condition exhibited a higher degree of escalation due to the greater tendency to win more

often and had a larger pool of experimental points than those in the 0-free ball condition. The increase in the availability of funds might have caused participants in the 5-free ball condition to be less sensitive to the potential losses. Experiment 2 attempted to rule out this possibility by testing predictions that stem directly from the assumption of increased goal value with decreased goal distance.

Chapter 3: Experiment 2

Method

Participants. One hundred fifty-one undergraduates from the University of Maryland participated in this experiment in exchange for partial course credit and a chance to win a coffee mug contingent on performance.

Design and Procedure. Upon entering the lab, participants saw six mugs displayed on the table and were told that they could earn one contingent on their performance. Their task was to solve a series of verbal puzzles, which consisted of anagrams in Part 1 of the experiment and a word search in Part 2. The experimental manipulation took place in Part 1.

Participants were randomly assigned to one of the three experimental conditions, termed Proximate, Distant, and Moderate. The conditions were so named because of the proportional distance from the goal we expected participants in each one to be in by the end of Part 1 (See Table 1). In the Proximate and Distant Conditions, participants had to solve 40 problems to earn a mug and in the Moderate Condition, they had to solve 30. In the Distant and Moderate Conditions, they were faced with 20 easy and 20 hard anagrams in part 1, while in the Proximate condition they were faced with 30 easy and 10 hard problems. Thus, as Table 1 illustrates, we expected participants in the Proximate Condition to be approximately 75%, those in the Moderate approximately 66% of the way, and those in the Distal approximately 50% of the way towards their goal by the end of Part 1.

Anagrams appeared sequentially and participants could skip any of them by typing "skip." The difficult anagrams consisted of rare 4- and 5-letter words with familiarity

ratings between 100 and 200 (e.g., lagan, pavis) drawn from the MRC Psycholinguistic Database (Wilson, 1988). In contrast, easy anagrams comprised common 4-letter words with familiarity ratings between 600 and 700 (e.g., girl, beer). The anagrams were pre-tested on 45 participants, who all solved all the easy anagrams, while no one solved more than 10% of the hard anagrams.

After finishing the anagrams, all participants were told how many correct answers they had accomplished, and the number of problems they still needed to solve in Part 2 in order to attain a mug. Next, participants were prompted to draw a rectangle on the computer screen that best represented the mug they had seen on the table. Participants could drag the edges of a rectangle to change its size. The rectangle area served as a proxy for the subjective value that individuals accorded the mug (Bruener & Goodman, 1947). Upon completing the rectangle, participants decided whether to continue on to Part 2, which consisted of a word-search puzzle on which they only needed to find the number of words necessary to attain a mug. The puzzle was a matrix of 15 x 15 letters with 30 animal names embedded in it. Instructions informed the participants that the puzzle theme was animals, but not what or where the hidden words were.

Participants had an unlimited amount of time to work on the puzzle. The amount of time they spent on the task, controlled for the number of words they found, served as the measure of escalation. Participants could end the program once they had found enough words to win a mug or at the point they decided to withdraw from the study.

Results

Seven participants (4.6%) were excluded from analysis for failing to draw a rectangle.

Manipulation checks. There was a significant difference at the end of Part 1 across the three conditions in the number of verbal problems participants needed to solve before winning a mug. At the end of Part 1, participants in the Distant, Moderate, and Proximate Conditions needed to solve 19.60, 12.33, and 9.90 additional problems in order to win a mug, and this difference was significant, $F(2, 141) = 111.63$, $p < .001$. In addition, the proportions of participants who ultimately reached their goal differed across the conditions in a manner consistent with our manipulation. These proportions were 32%, 60%, and 66% for the Distant, Moderate, and Proximate conditions, respectively, $\chi^2(2)$ =16.23, $p < .01$.

Main analyses. We look first at time per found word in Part 2 and then at drawn rectangle size as a function of experimental condition. As predicted, participants spent more time on the second part of the experiment when they had completed a greater proportion of the goal (Figure 2). A one-way ANCOVA with average time per found word as the dependent variable and the number of problems solved correctly in the first part of the experiment as a covariate revealed that there was a significant difference in the amount of time participants spent on the word-search puzzle, $F(2, 140) = 3.02$, $p = .05$.[4] After adjusting for the number of words participants found in the first part of the experiment, participants spent an increasingly higher amount of time, on average, on the second part of the experiment (Ms =13.43 min, 15.75 min, and 17.54 min, for those in the Distal, Moderate, and Proximal conditions, respectively). Linear trend analysis showed that participants spent more time on the second part of the experiment as they closed in on their goal, $F(1, 140) = 5.95$, $p < .02$ (Table 2).

---

[4] The homogeneity of variance assumption was not violated in all ANCOVA analyses.

Turning to the rectangle sizes, participants drew bigger rectangles when they were closer to the goal than when they were not (Table 3), $F(2, 141) = 4.59$, $p < .02$. Linear trend analysis showed that participants drew larger rectangles as they solved more verbal problems in Part 1 (Ms = 11.28 in^2, 12.81 in^2, and 14.39 in^2, for the Distant, Moderate, and Proximate condition, respectively), $F(1, 141) = 9.18$, $p < .01$. Table 3 summarizes the results.

Our hypothesis is that persistence in Part 2 is a function of subjective goal value, which increases as relative distance from the goal decreases. In other words, we are assuming that the persistence is not due to goal distance *per se*, but to the accompanying increased goal value. If that is so, and if drawn rectangle size is an indicator of subjective goal value, then a mediation test should show that the independent variable of Distant, Moderate, or Proximate Condition predicts time in Part 2 when rectangle size is not taken into account, but not when it is. Precisely this result occurred: Experimental condition—the goal distance—significantly predicted both participants' persistence on the word-search puzzle ($B = 2.33$, $SE = .96$, $p < .05$) and the size of the representation of the mug they drew ($B = 1.55$, $SE = .51$, $p < .05$). In addition, the size of the drawn representation of the mug significantly predicted participants' persistence on the word-search puzzle ($B = .42$, $SE = .15$, $p < .01$). Finally, when both the experimental manipulation and size of the drawn representation of the mug were included in the same equation predicting participants' persistence on the puzzle, the experimental condition did not significantly predict the time participants spent on the word-search puzzle, $B = 1.68$, $SE = .97$, $p < .09$ (Figure 4), suggesting that there is full mediation. Following the procedure described in Preacher & Hayes (2004), I tested the significance of mediation by conducting a

bootstrapped-corrected estimate of the indirect effect size and showed the 95%

confidence interval of the total indirect effect was between .07 and 1.44. The exclusion of

0 indicates that mediation was significant.

Discussion

The pattern of results rules out the wealth effect as a plausible alternative

explanation. Individuals accumulated no prior winnings, so they do not receive any

"cushion" to increase their risk-taking propensities by taking more costly draws as they

might have done in Experiment 1. Instead, the data support the contention that escalation

tendency is related to the value individuals attribute to the goal and that the goal's value

increases as it is approached. Participants who were closer to the goal viewed the mug as

more valuable, as evidenced by the larger size they attributed to it, and consequently

showed more persistence in working toward a mug.

Experiment 2 studied how the value of the goal may increase as it is approached.

While the results are suggestive, it is impossible to discern whether the behavior was

irrational. However, it should be noted that a claim about irrationality is difficult to make

when value and cost of attaining the goal are subjective. The data only suggested that

escalation was more pronounced as the goal was approached given that the payoff and

cost were opaque. It was impossible to determine the rationality of spending additional

time on the word-search puzzle. To circumvent this problem, Experiment 3 uses a

different measure for irrationality, time spent on unsolvable problems when solvable

problems are available, as an indicator for irrationality. Because there is no reason for

participants to spend more time on unsolvable problems in the hope to finish the project

23

or attain an object as its attainment is near, the time spent on unsolvable problems was used as a measure for irrational escalation of commitment.

As discussed at the beginning of this paper, escalation of commitment refers to individuals' tendencies to spend additional resources on a chosen course of action rather than quitting or moving to a new course. Experiment 3 aims to replicate the finding that participants attributed more value to the chosen course of action, and also examined how individuals evaluated a course that was not chosen. Past research on escalation of commitment has shown that decision-makers rarely consider alternatives once sunk costs have been accumulated (Boulding, Morgan, & Staelin, 1997), and fail to consider the benefits of the foregone alternative (Northcraft & Neale, 1986). The joint effects of ignoring the alternatives and failing to fully incorporate the opportunity costs have therefore been suggested as the underlying causes for escalation once individuals have invested in a course of action. In a similar vein, research on goals and needs suggests that objects that do not relate to the goal are often devalued, presumably because motivation for pursuing those objects is inhibited so that it can be reserved for the focal goal (Brendl, Markman, & Messner, 2003; Markman, et al., 2007). Therefore, individuals have a higher level of motivation for attaining an object related to the need and less motivation for attaining objects that are unrelated to the activated need. The motivational difference is therefore assumed to influence how objects, both related and unrelated to the need, are valued and moreover cause the two values to be negatively related. In summary, the motivational strengths for goal-related and non-goal-related items differ, and an increase in one entails a decrease in the other.

However, Zajonc (1968) has contended that mere exposure to an object increases affinity for it, which suggests that once noticed an object's value increases. In light of these competing predictions, Experiment 3 is designed to explore the effect of proximity to the goal on the subjective value of goal as well as of an achievable alternative to it. I hypothesize that as individuals approach the goal, the need and motivation for it increases, thereby strengthening its value, while decreasing the value of an available alternative.

Chapter 4: Experiments 3 and 4

Experiment 3 extends the results in the previous study and tests the hypothesis that the goal proximity exacerbates the difference in value between the goal and its antithesis, which in turn, drives individuals to escalate irrationally in their chosen course of action. I manipulated goal proximity while eliciting values participants placed on both the goal and the alternative and hypothesized that the price differential between the two objects underlies individuals' tendencies to escalate commitment.

Method

Participants. One-hundred-nineteen undergraduates from the University of Maryland participated in this experiment in exchange for partial course credit and a chance to receive either a chocolate bar or monetary payment.

Design and Procedure. Participants first attempted thirty anagrams that were randomly drawn from the stimuli used in Experiment 2, such that half were easy and the remaining half were difficult. Prior to taking the experiment, participants learned that they could win a 3.5 oz. chocolate bar (big prize) if they solved enough anagrams on the computer; otherwise they would receive an 1.2 oz chocolate bar (consolation prize). Participants were then randomly assigned to either the Proximate or Distant condition, the difference being that those in the Proximate condition were told that they needed to solve 20 anagrams to win a big chocolate bar and those in the Distant condition were told they needed to solve 25.

Anagrams appeared sequentially and participants could skip any anagram they wished by typing "skip." To ensure that the feedback on the relative progress between

participants the two experimental conditions did not engender different levels of affect, participants filled out a brief measure of positive and negative affect scale (PANAS; Watson, Clark, & Tellegen, 1988) after they completed the anagrams. At that time, they also indicated their selling prices for both the big and consolation prizes. The true selling price was elicited using the Becker, DeGroot, and Marschak procedure (BDM; Becker, DeGroot, & Marschak, 1964). Participants indicated their selling prices by circling a value in a list that ranged from $0.25 to $3.00 in $0.25 increments for the big prize and from $.25 to $2.00 in $0.25 increments for the consolation prize. Participants had the option to not sell the prize by indicating that they had no intention to sell it to the experimenter.

Next, all participants were told the number of correct answers they had achieved, and the number of correct problems they still needed to solve in order to win the big prize. They were reminded again that failure to reach the required goal would result in their receiving the consolation prize. Participants assigned to the Proximate condition learned that there were 20 additional anagrams available and that they only needed to solve a sufficient number to win the big prize. In contrast, participants assigned to the Distant condition learned that there were 25 additional anagrams available. Two unsolvable word-strings (easeh and alaen) appeared sometime during the first four anagrams. Time spent on these word-strings constituted our index of persistence. The experiment ended whenever participants successfully found a sufficient number of anagrams to win the big prize, they exhausted all anagrams, or they gave up.

Upon completion, the experimenter conducted the BDM procedure to determine whether participants were required to sell or keep the prize they had won.

Results

The response "never sell to the experimenter" was coded as $3.25 and $2.25 for the big and consolation prize, respectively. Neither the positive nor the negative affect scores differed between the Proximate and Distal Conditions.

Selling prices. Figure 5 depicts the average selling prices for the big and consolation prize as function of goal distance. A 2 (prize: Big v. Consolation) x 2 (distance: Proximate v. Distant) mixed ANOVA with repeated measure on the first factor revealed that the only significant main effect was the prize condition, $F(1, 112) = 407.43$, $\eta_p = .81$, $p < .001$. The average selling price for the big prize ($M = \$2.21$, $SE = .07$) was above that of the consolation prize ($M = \$1.42$, $SE = .06$). Consistent with the main hypothesis, the significant interaction Prize X Distance showed participants in the Proximate condition valued the big prize more than those in the Distant condition, but the same participants also showed a stronger tendency to devalue the consolation prize, $F(1, 112) = 4.01$, $p < .05$, $\eta_p = .04$. The average selling price of big prize for participants in the Proximate condition was $2.33 ($SE = .10$), as opposed to $2.25 ($SE = .09$) for participants in the Distant condition. Those in the Proximate condition valued the consolation prize at $1.28 ($SE = .07$) on average, compared to $1.40 ($SE = .07$) for those in the Distant condition. However, results are qualified by a closer examination on the simple effects which revealed that these differences were not significant.

Time spent on unsolvable word-strings. Consistent with the hypothesis that those who were closer to the goal would spend more time on the task, the total amount of time

spent on unsolvable word-strings was higher in the Proximate (M = 1.72 min, SE = .16), than in the Distant condition (M = 1.33 min, SE = .10), F (1, 117) = 3.91, p = .05.[5]

Mediation of escalation tendency by changes in value attributions. Our hypothesis contends that the value difference between the big and consolation outcomes, as indicated by the difference in their selling prices, is the main underlying reason why individuals escalate commitment. I conducted a mediation analysis to test this hypothesis by regressing the price differential and time spent on unsolvable word-strings onto the experimental condition separately and found that experimental condition significantly predicted the difference in prices between the big and consolation prize, B = -.18, SE = .08, p < .05, and time spent on unsolvable word-strings, B = -.37, SE = .19, p < .05. The price differential also significantly predicted the time spent on unsolvable word-strings, B = .88, SE = .19, p < .001. Finally, when both the experimental manipulation and price differential were included in the same equation predicting participants' persistence on the puzzle, the former became nonsignificant and the latter remained significant (B = -.20, SE = .18, p = .28, and B = .83, SE = .20, p < .01, respectively), indicating a full mediation. Following the procedure described in Preacher & Hayes (2004), I tested the significance of mediation effect by conducting a bootstrapped-corrected estimate of the indirect effect size and showed the 95% confidence interval of the total indirect effect was between -.37 and -.01. The exclusion of 0 indicates that mediation was significant. Figure 6 summarizes the mediation results.

---

[5] Five participants did not fill out the selling prices before attempting the unsolvable word-strings. They were not included in the analysis on selling prices but were included in the analysis on time.

Discussion

Experiment 3 suggests that the value of the goal increased and that of its alternative decreased as the completion of the course neared. Participants in both conditions completed the same number of anagrams in the first part of the experiment, yet, they spent more time on the unsolvable word-strings in the Proximate than in the Distant condition. The price differential fully mediated the goal distance and the time participants spent on unsolvable word-strings. The mediation model indicates that escalation of commitment was influenced by the exaggerated difference between the value of the chosen course and its alternative as individuals became closer to attaining the goal. Proximity to completion exacerbates the price differential between the chosen course and its alternative, thereby driving individuals to continue to engage in the same course,

However, the results might in part due to the combined effects of having a ceiling on the possible bids and to having that value lower for the small than the large candy bar. In this experiment, participants could only indicate their selling prices to up to \$2.00 for the small chocolate bar and \$3.00 for the big chocolate bar. This design feature raises the possibility that the devaluation effect observed in the experiment might be due to the lower limit for the small chocolate bar than for the large one. However, as Figure 7 shows, the ceiling effect was more pronounced for the selling price of the big chocolate bar, suggesting that the ceilings may actually have created a more conservative test for the devaluation hypothesis. In light of this, Experiment 4 tests the prediction that a more pronounced devaluation effect as a function of goal distance will occur if the ceilings are eliminated. I conducted a follow-up experiment testing this hypothesis by changing the method of eliciting the selling price.

Experiment 4

Method

Participants. Thirty-six participants (30 undergraduates and six graduate students) from the University of Maryland participated in this experiment in exchange for partial course credit and a chance to receive either a chocolate bar or monetary payment.

Design and Procedure. The design and procedure were identical to the previous experiment except that participants wrote down their own selling prices for both big and small chocolate bars. Participants had the freedom to write down any selling prices they wish. However, unbeknownst to the participants, the highest price that the experimenter was willing to offer was $4.00 for the big and $3.00 for the small chocolate bar. Therefore, participants had no chance of selling their chocolate bars back to the experimenter if they had indicated a selling price beyond the experimenter's maximum price. Participants' final earnings were rounded up to the nearest quarter if the chocolate bar was sold back to the experimenter.

Results and Discussion

Two participants failed to provide selling prices. They were included in the analysis on time spent on the unsolvable word-strings but were excluded from all other analyses. A 2 (prize: Big v. Consolation) x 2 (distance: Proximate v. Distant) mixed ANOVA with the first factor as a repeated measure revealed that there is a significant interaction between the two factors, $F(1, 32) = 10.35.$, $\eta_p = .186$, $p < .01$. Note that the effect size is higher than one found in Experiment 3, providing tentative evidence that the ceiling effect might have reduced the devaluation effect, rather than drive it. In light of the

significant interaction, consider the simple effects. The average selling price for the big and small chocolate bar in the Proximate condition was \$2.50 ($SE = .18$) and \$1.64 ($SE = .13$), respectively. The difference was statistically significant, $F(1, 32) = 30.92$, $p < .01$. In contrast, the average selling for the big and small chocolate bar in the Distant condition was \$1.83 ($SE = .15$) and \$1.59 ($SE = .09$), respectively. The difference was not statistically significant $F(1, 32) = 2.92$, $p < .10$. Figure 8 depict the results and showed the price differential to be more pronounced in the Proximate compared to the Distant condition.

The total amount of time spent on unsolvable word-strings was higher in the Proximate ($M = 1.78$ min, $SE = .26$), than in the Distant condition ($M = 1.23$ min, $SE = .15$). However, the difference was $t(34) = 1.82$, $p = .039$, one tailed.

I forego the mediation analysis because sample size is too small to lend to traditional mediation analysis. However, the increase in the devaluation effect combined with the distributions of selling prices for both the big and small chocolate bars in Experiment 4 suggest that an increase in the sample size will provide a similar pattern of mediation as shown in Experiment 3.

Chapter 5: General Discussion

The current paper sets out to (1) examine whether irrational escalation can occur when the sunk costs are either opaque or transparent and (2) provide an explanation of escalation not in terms of sunk costs, but in terms of increased object's value associated with decreased distance from attaining the object (goal). With regard to point (1), Experiment 1 shows that individuals do irrationally escalate even when costs, payoffs, and the rational course of action are made apparent to them. Moreover, escalation was greater when sunk costs were low than when they were high. Experiments 2 and 3 generalize the escalation results to cases in which sunk costs are opaque and a rational strategy cannot be derived. In all three experiments, the total experimental points invested and the number of problems participants had solved previously did not change the level of escalation.

With regard to point (2), Experiment 2 showed that object's value, as indexed by perceived size of the outcome, increased as relative goal distance decreased. Particularly relevant to our explanation, a mediation analysis showed that the effect of goal distance on persistence was due entirely to changes in goal value. Experiments 3 and 4 replicated these results and showed, moreover, that the perceived value of an alternative to the chosen course for attaining the object decreased in value as distance from its attainment decreased.

Our explanation is based on the goal-gradient hypothesis, which states that the speed of locomotion is negatively related to the distance from the goal (Hull, 1932). This empirical finding has been extended recently to different facets of consumer behaviors such as purchasing frequency and brand loyalty (Kivetz et al., 2006). The results in this

paper show that motivation for goal attainment can also be translated into economic decision-making. All four experiments showed that individuals' spent increasing sums of resources as they approached the goal, irrespective of the amount of sunk costs they had incurred.

Why does goal proximity increase the attractiveness or value of the goal and therefore the motivation to attain it? The traditional goal theories proposed that an incomplete goal causes "quasi needs" in which the need to achieve the goal increases due to mounting tension during the period in which the goal remains unfinished (Lewin, 1935). More recent theories provide alternative perspectives on the question. Thus, research on goal instrumentality has shown that stimuli that are related to the goal received more attention than stimuli that are not (Ratneshwar, Warlop, Mick, & Seeger, 1997). Studies on goal pursuit have shown that individuals can unconsciously direct attention to concepts that are related to the focal goal while inhibiting unrelated concepts (Förster, Liberman, & Higgins, 2005; Moskowitz, Li, & Kirk, 2004; Shah, Friedman, & Kruglanski, 2002). It has also been argued that self-regulation and limited cognitive resources guide individuals' capacities to attend to the goal-relevant concepts while shielding concepts unrelated to the goal (Bandura & Cervone, 1983; Carver, 2004; Carver & Scheier, 1998; Higgins, 1987; Kernan & Lord, 1988), and that the increase in the goal-relevant knowledge and concepts helps individuals to choose appropriate means for goal attainment (Förster, Liberman, & Higgins, 2005; Gollwitzer & Moskowitz, 1996). In summary, various goal theories all posit in one way or another that an increase in goal-relevant attention and knowledge drive individuals to continue pursue the same goal. However, these theories do not explain how the participants' evaluations of the goal

34

change as they approach it.

In this paper, I find evidence to support the contention that the value gap between the chosen and foregone course of action will grow as individuals continue to commit to the same course of action, making the pursued goal subjectively more valuable than alternatives. This gap plays a central role in determining individuals' tendencies to escalate and provides a theoretical explanation as to why individuals escalate. The experiments build on the goal-gradient hypothesis in that the proximity to the goal increases the value of it but decreases the value of alternatives to it, making the chosen course more appealing to pursue.

Implications for escalation research

Research on escalation of commitment has primarily focused on individuals' failures to withdraw from a course after sunk costs have been incurred, with little regard for how individuals evaluate alternatives to their chosen course. The sunk costs account provides no clear theory on how individuals evaluate the chosen course and its alternatives. In contrast, the current paper proposes a new explanation for escalation of commitment based on evaluations of multiple outcomes. According to this explanation, the price differential between the goal and its alternative fully mediated the goal distance and the time participants spent on unsolvable word-strings. The mediation model indicates that escalation of commitment is influenced by the increased difference between the value of the goal and its alternatives as individuals come closer to attaining the goal. This increasing value differential drives individuals to persist in their goal pursuit as the goal becomes (or appears to become) closer.

Whyte (1993) has argued that the relationship between sunk costs and escalation of commitment may be an artifact because past escalation research rarely provides information on alternative choices, leaving the participants with only an alternative of disengagement during the course of escalation. In this paper, an alternative was made available and participants were guaranteed to receive the alternative without putting forth any effort. The data in Experiment 3 showed participants who were closer to the goal spent more time on the unsolvable word-strings. The presence of an alternative did not reduce escalation as suggested in Whyte (1993). Instead, the alternative object was devalued by the participants and served to motivate participants to escalate their commitment in hope to attain the big prize. Future research should look more closely at the role of alternatives in influencing escalation towards a given goal.

Implications for motivational research

Classical motivational models generally stress that commitment to a goal is based on the multiplicative effect of goal's value and expectancy (e.g., Lewin, 1935; Vroom, 1964). Expectancy is often related to goal proximity by assuming that a decrease in goal distance increases the expectancy of goal attainment (Gjesme, 1981), so motivation is the product of goal distance and value of the object. However, results from this paper suggest that the level of motivation depends largely on the goal expectancy and value is not independent of goal expectancy. Therefore, goal expectancy may play a more important role in determining individuals' commitments to their goals than previously assumed, in that the value could be exaggerated due to an increase in goal expectancy. Instead of motivation being a function of value and expectancy, a more generalized function depending on expectancy might better describe motivational strength.

Limitations and future research

One possible concern about our research is that none of the tasks carries significant consequences. Experiment 1 used hypothetical gambles and Experiment 2 and 3 used anagrams to test persistence, which was further removed from the economic domain. Future research would be valuable that extends the current findings to naturalistic settings for external validity, which would broaden the applicability of escalation research.

Another possible research direction might involve manipulating the framing of the goal pursuit as either distance traveled towards or distance remaining from the goal. Recent research reveals that the progress towards and the distance remaining from the goal have opposite effects on individuals' tendencies to escalate. Moreover, individuals who are highly committed to the course of action are more motivated when they learn about the distance remaining whereas those who are less committed are more motivated by information on how much progress they have made (Koo & Fishbach, 2008). High sunk costs, accountability, and a threat of having personal performance monitored all have been found to increase the level of commitment to the goal. Although the format of progress presentation is pertinent only when the task is completed half-way and its eventual completion is uncertain, it would be of interest to test whether different formats of goal completion rates can engender a differential level of escalation when individuals face high (versus low) sunk costs or are (versus are not) held accountable.

Conclusion

Escalation of commitment has long been viewed as economically-motivated behavior, and its cause has been attributed to factors associated with sunk costs. According to sunk-cost theories, the amount of resources already invested into a project

causes individuals to redirect additional resources into the same project. However, the evidence to support this account is mixed in large part due to failure in providing information on costs and benefits. If escalation of commitment is an irrational economic decision, then information on costs and payoffs should be provided to test the economic rationality of escalation. The best-known scenarios (e.g., A&S investments, discount versus full ticket price, etc.) that purportedly demonstrated the escalation tendency have not provided such information. This has led some researchers to assume that sunk costs would cause escalation only when economic information is opaque (Heath, 1995), but experimental evidence shows that opaque sunk costs and payoffs had no effect on escalation (Soman, 2001).

This paper provides an alternative to explain escalation of commitment, in which I show that individuals' tendencies to escalate are sensitive to distance from completing the chosen course of action. Moreover, the distance from the completion of the chosen course gives rise to the change in the valuation of the pursued course and affected individuals' tendencies to escalate. Individuals seem to rely on information regarding distance from the goal to determine whether to commit escalation, and results from this paper suggests that the reliance on distance applies to situations where costs and payoffs are both transparent and opaque.

Decades of research on escalation have provided innumerable evidence to show that sunk costs are linked to escalation of commitment. Therefore, it is important to note that sunk costs can take on many forms. This paper designed sunk costs as costs of completing the course of action for attaining an object, but individuals often treat sunk costs as a personal failure rather than as costs (e.g., Brockner et al., 1986; Caldwell &

O'Reilly, 1982; Sivanathan, Molden, Galinsky, & Ku, 2008). When viewed as an economic cost, high sunk costs may mitigate any escalation tendency, but the tendency emerges when sunk costs threaten self-esteem (Sivanathan et al., 2008). A high level of sunk costs has the capacity to induce commitment escalation in individuals and organizations when the costs become psychologically meaningful.

The results of this study lead one to wonder whether we inevitably set ourselves up for disappointment when we focus on attaining a specific goal. In a *Calvin and Hobbes* comic strip, Calvin buys a box of cereal for the toy inside. Eager to finish the cereal for the toy, Calvin eats three bowls of cereal each morning (not for its taste) while imagining increasingly more wild scenarios of all the fun he will have with the toy. Eventually, it is revealed that the plastic toy cannot live up to Calvin's expectations. Just as with the participants in the study, both Calvin's motivations and judgments are influenced by goal proximity. When individuals get closer to achieving their goal, the goal does indeed loom larger and become more attractive than it objectively warrants.

Table 1

Overview of the Procedure in Experiment 2

Anagram difficulty	Number of anagrams must solve	
	Forty anagrams	Thirty anagrams
30 difficult/10 easy anagrams	Proximate (75% complete)	
20 difficult/20 easy anagrams	Distant (50% complete)	Moderate (66% complete)

Table 2

The adjusted time, in minutes, participants spent on the word-search puzzle as a function

of the proportion of completed goal in Experiment 2 ($\pm$ 1 SE of the mean).

	Experimental Conditions		
	Distant	Moderate	Proximate
Time (*SE*)	13.43 (1.19)	15.75 (1.21)	17.54 (1.19)

Table 3

The mean size of the rectangle (in^2) drew by participants as a function of the proportion

of completed goal in Experiment 2 ($\pm$ 1 SE of the mean).

|	Experimental Conditions		
	Distant	Moderate	Proximate
Area (in^2)	11.28 (.76)	12.81 (.71)	14.39 (.70)

Figure 1

A sample trial in Experiment 1. Numbers that are italicized are provided to the

participants in the experiment in the high sunk costs condition.

| Draw	P(success)	Payoff	Cost	Expected value	Tot sunk costs
1	1/10	500	-38	50.00	-38
2	1/9	500	-44	55.55	-82
3	1/8	500	-52	62.5	-134
4	1/7	500	-62	71.43	-196
5	1/6	500	-76	83.33	-272
6	1/5	500	-95	100	-367
7	1/4	500	-125	125	-492
8	1/3	500	-170	166.67	-662
9	1/2	500	-260	250	-922
10	1	500	-532	500	-1454

Figure 2

The adjusted time (min) participants spent on the word-search puzzle as a function of the

proportion of completed goal in Experiment 2 (the error bars are standard error of the
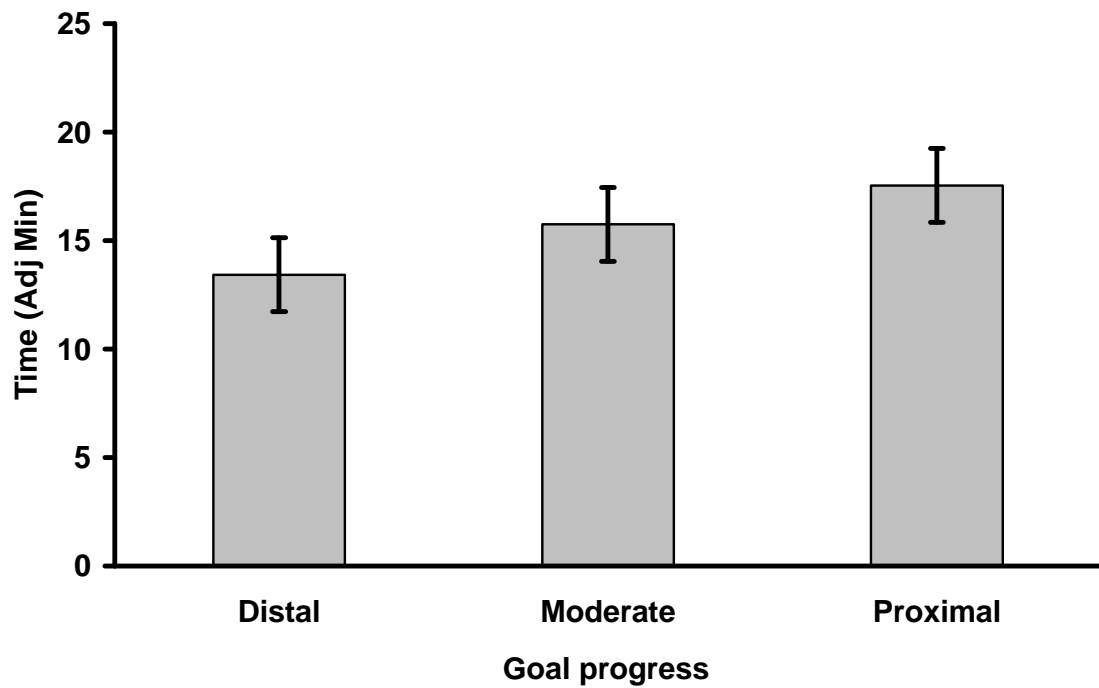
mean).

Figure 3

The mean size of the rectangle (in^2) drew by participants as a function of the proportion

of completed goal in Experiment 2 (the error bars are standard error of the mean).
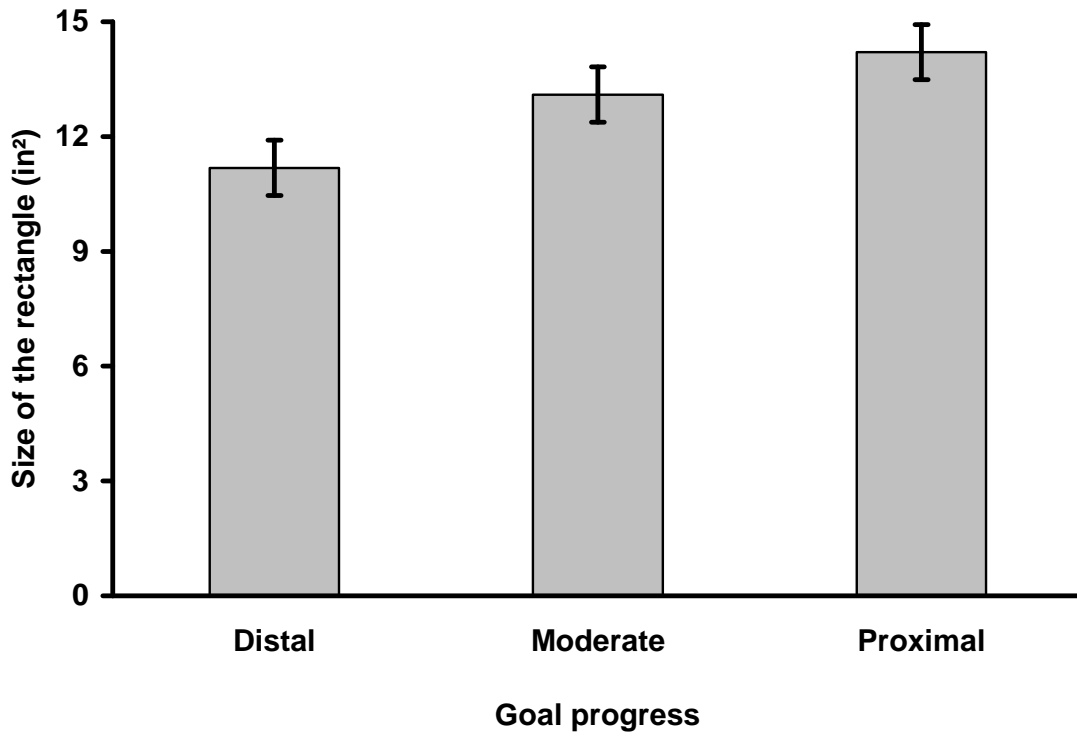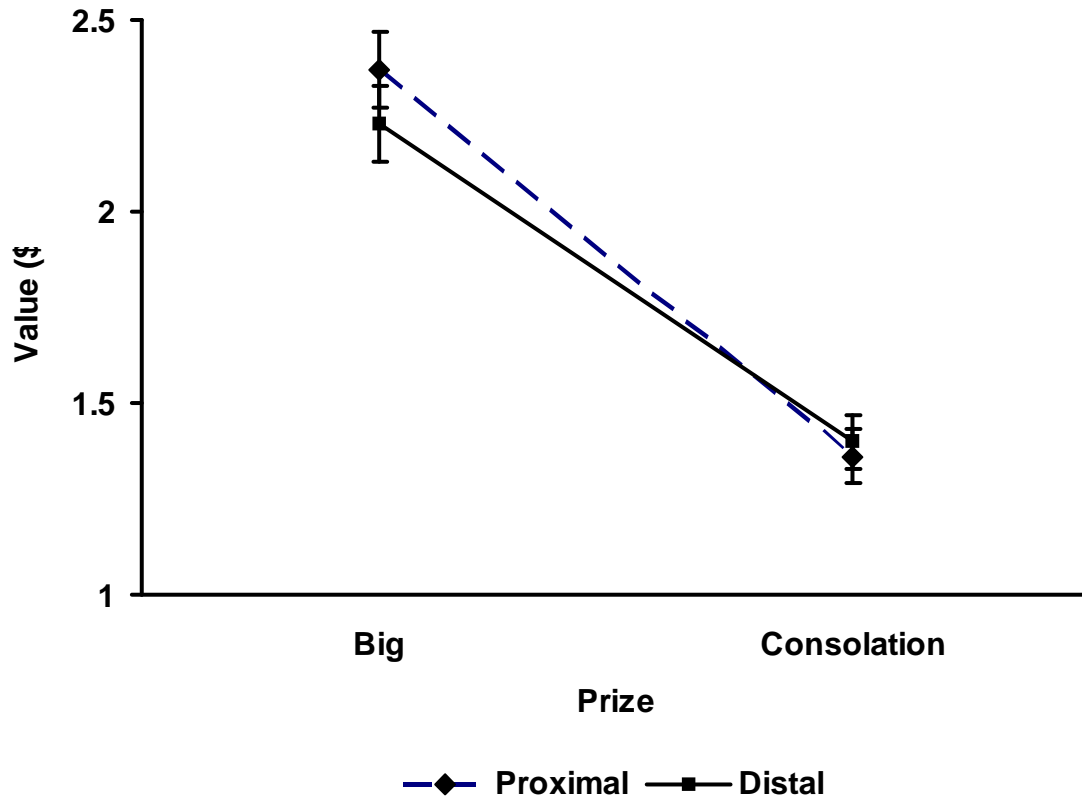
Figure 4

Model illustrating goal value mediating the relationship between goal distance and time

spent on the second part of the experiment in Experiment 2.

Goal proximity condition		Time spent on puzzle

2.33* (1.68)

-.18*   .88*

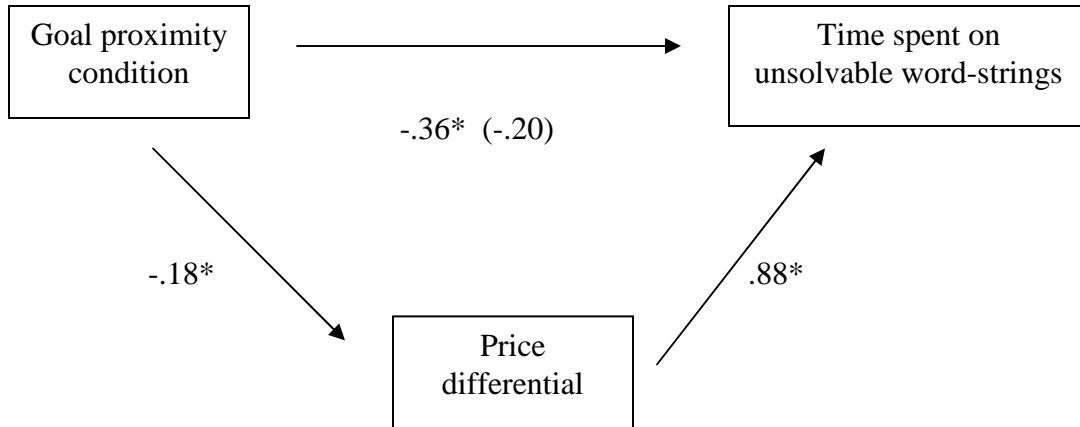| Size of the rectangle |
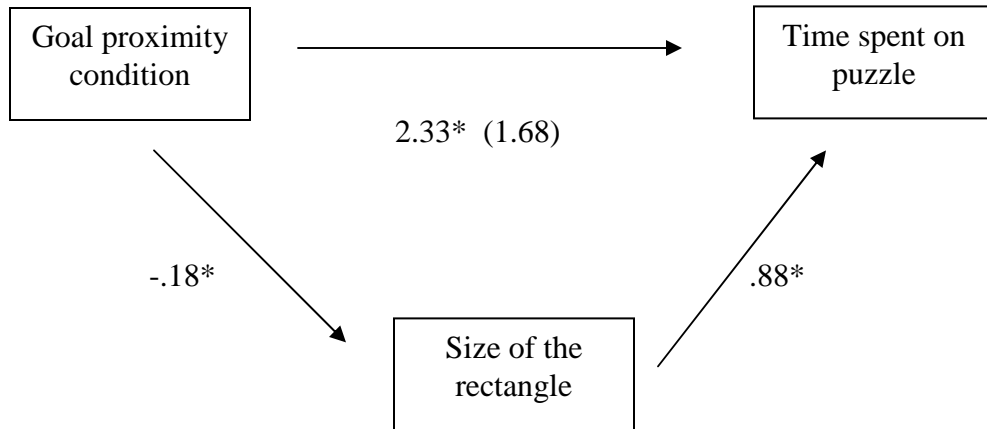
Note. * *p* <.05

Figure 5

Average selling price for both big and consolation prizes as a function of goal distance in Experiment 3 (the error bars are standard error of the mean).

Figure 6

Model illustrating goal value mediating the relationship between goal distance and time

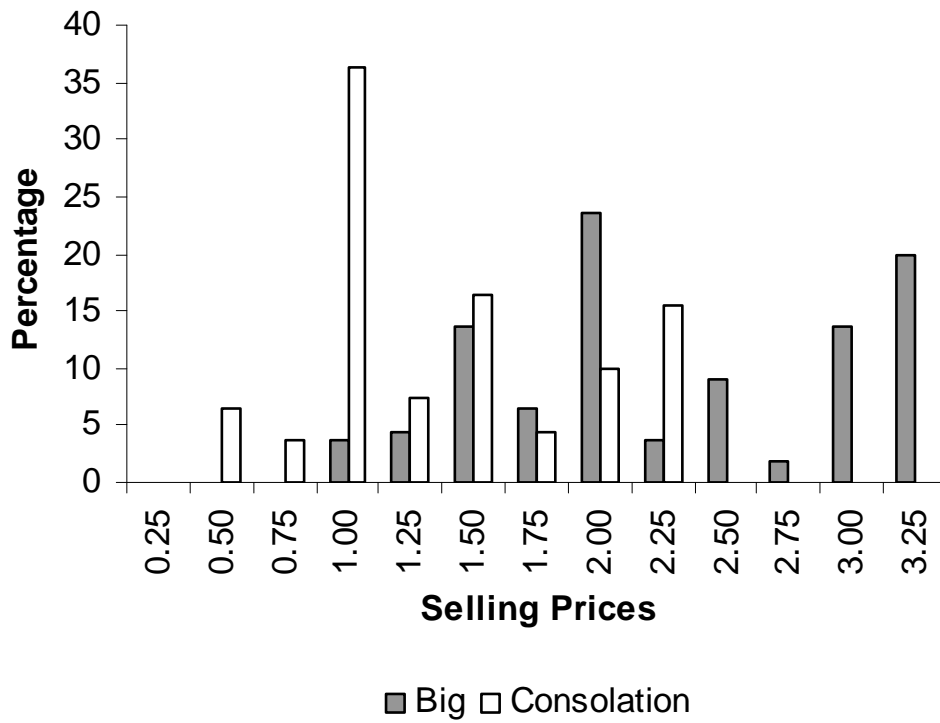spent on the second part of the experiment in Experiment 2.
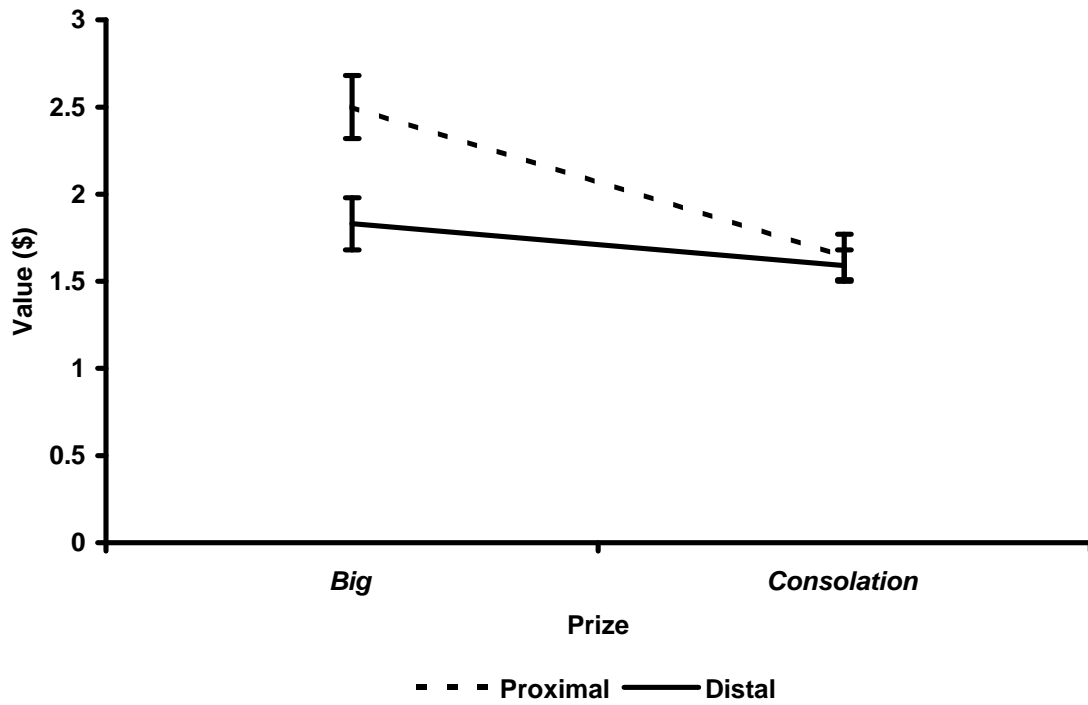

Note. * *p* <.05

Figure 7

The distribution of selling prices indicated by the participants for big and chocolate bars

in Experiment 3.

Figure 8

Average selling price for both big and consolation prizes as a function of goal distance in Experiment 3B (the error bars are standard error of the mean).

References

Arkes, H. R., & Ayton, P. (1999). The sunk cost and Concorde effects: Are humans less

    rational than lower animals? *Psychological Bulletin, 125*, 591-600.

Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational*

    Behavior and Human Decision Processes, 35, 124-140.

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological*

    Review, 64, 359–372.

Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms

    governing the motivational effects of goal systems. *Journal of Personality and*

    Social Psychology, 45, 1017–1028.

Bazerman, M. H., Giuliano, T., & Appelman, A. (1984). Escalation of commitment in

    individual and group decision making. *Organizational Behavior and Human*

    Decision Processes, 33, 141-152.

Becker, G.M., DeGroot, M.H., & Marschak, J. (1964). Measuring utility by a single-

    response sequential method. *Behavioral Science, 9*, 226–232.

Boehne, D. M., & Paese, P. W. (2000). Deciding whether to complete or terminate an

    unfinished project: A strong test of the project completion hypothesis.

    Organizational Behavior and Human Decision Processes, 81, 178-194.

Boulding, W., Morgan, R., Staelin, R. (1997). Pulling the plug to stop the new product

    drain. *Journal of Marketing Research, 34*, 164-176.

Brendl, C. M., Markman, A. B., & Messner, C. (2003). The devaluation effect:

    Activating a need devalues unrelated objects. *Journal of Consumer Psychology, 29,*

    463-473.

Brockner, J. (1992). The escalation of commitment to a failing course of action: Toward theoretical progress. *Academy of Management Review, 17,* 39-61.

Brockner, J., Houser, R., Lloyd, K., Nathanson, S., Birnbaum, G., Deitcher, J., et al. (1986). Escalation of commitment to an ineffective course of action: The effect of feedback having negative implications for self-identity. *Administrative Science Quarterly*, *31*, 109-126.

Brockner, J., Shaw, M. C., & Rubin, J. Z. (1979). Factors affecting withdrawal from an escalating conflict: Quitting before it's too late. *Journal of Experimental Social Psychology, 15*, 492-503.

Brown, J. S. (1948). Gradients of approach and avoidance responses and their relation to motivation. *Journal of Comparative and Physiological Psychology, 41,* 450-465.

Bruner, J. S., & Goodman, C. C. (1947). Value and need as organizing factors in perception. *Journal of Abnormal and Social Psychology, 42*, 33–44.

Caldwell, D. F., & O'Reilly, C. A. (1982). Responses to failures: The effects of choices and responsibility on impression management. *Academy of Management Journal, 25*, 121–136.

Camerer, C., F., & Weber, R. A. (1999). The econometrics and behavioral economics of escalation of commitment: a re-examination of Staw and Hoang's NBA data. *Journal of Economic Behavior and Organization, 39*, 59-82.

Carver, C. S. (2004). Self-regulation of action and affect. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation* (pp. 13–39). New York: Guilford.

Carver, C. S., & Scheier, M. F. (1990), Origins and functions of positive and negative affect: A control-process view. Psychological Review, 97, 19-35.

Carver, C. S., & Scheier, M. F. (1998). On the self-regulation of behavior. New York: Cambridge University Press.

Conlon, D. E., & Garland, H. (1993). The role of project completion information in resource allocation decisions. *Academy of Management Journal, 36*, 402-413.

Ferguson, M. J., & Bargh, J. A. (2004). Liking is for doing: The effects of goal pursuit on automatic evaluation. *Journal of Personality and Social Psychology, 87, 557–572.*

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford University Press.

Förster, J., Higgins, E. T. & Idson, L. C. (1998). Approach and avoidance strength during goal attainment: Regulatory focus and the "goal looms larger" effect. *Journal of Personality and Social Psychology*, 75, 1115-1131.

Förster, J., Liberman, N., & Higgins, E. T. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology, 41,* 220–239.

Garland, H. (1990). Throwing good money after bad: The effect of sunk costs on the decision to escalate commitment to an ongoing project. *Journal of Applied Psychology, 75,* 728–731.

Garland, H., & Conlon, D. E. (1998). Too close to quit: The role of project completion in maintaining commitment. *Journal of Applied Social Psychology, 28*, 2025-2048.

Garland, H., & Newport, S. (1991). Effects of absolute and relative sunk costs on the decision to persist with a course of action. *Organizational Behavior and Human Decision Processes*, *48***,** 55–69.

Garland, H., Sandefur, C. A., Rogers, A. C. (1990). De-escalation of commitment in oil exploration: When sunk costs and negative feedback coincide. *Journal of Applied Psychology, 75*, 721-727.

Gjesme, T. (1981). Is there any future in achievement motivation? Motivation and

    Emotion, 5, 115-138.

Gollwitzer, P. M., & Moskowitz, G. B. (1996). Goal effects on action and cognition. In

    E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic*

    principles (pp. 361–399). New York: Guilford.

He, X., & Mittal, V. (2007). The effect of decision risk and project stage on escalation of

    commitment. *Organizational Behavior and Human Decision Processes, 103*, 225-

    237.

Heath, C. (1995). Escalation and de-escalation of commitment in response to sunk costs:

    The role of budgeting in mental accounting. *Organizational Behavior and Human*

    Decision Processes, 62, 38-54. .

Heath, C., Larrick, R. P., &Wu, G. (1999). Goals as reference points. *Cognitive*

    Psychology, 38, 79–109.

Heath, C., & Soll, J. (1996). Mental budgeting and consumer decisions. *Journal of*

    Consumer Research, 23, 40-52.

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological*

    Review, *94*, 319–340.

Hull, C. L. (1932). The goal-gradient hypothesis and maze learning. *Psychological*

    Review, 39, 25–43.

Hull, C. L. (1934). The rat's speed-of-locomotion gradient in the approach to food.

    Journal of Comparative Psychology, 17, 393-422.

Kahneman, D., Tversky, A. (1979). Prospect theory: An analysis of decision under risk.

    Econometrica, 47, 263-292.

Kernan, M. C., & Lord, R. G. (1988). Effects of participative versus assigned goals and feedback in a multi-trial task. *Motivation & Emotion, 12,* 75–86.

Kivetz, R., Urminsky, O., Zheng, Y. (2006). The goal-gradient hypothesis resurrected: Purchase acceleration, illusory goal progress, and consumer retention. *Journal of Marketing Research, 43,* 39-58.

Koo, M., & Fishbach, A. (2008). Dynamics of self-regulation: How (un)accomplished goal actions affect motivation. *Journal of Personality and Social Psychology, 94,*183-195.

Ku, G., Galinsky, A. D., & Murgighan, J. K. (2006). Starting low but ending high: a reversal of the anchoring effect in auctions. *Journal of Personality and Social Psychology, 90*, 975-986

Ku, G., Malhotra, D., & Murnighan, J. K. (2005). Towards a competitive arousal model of decision-making: A study of ''auction fever'' in live and internet auctions. *Organizational Behavior and Human Decision Processes, 96*, 89–103.

Lewin, K. (1935). *A dynamic theory of personality*. New York: McGraw–Hill.

Markman, A. B., Brendl, C. M., Kim, K. (2007). Preference and specificity of goals. *Emotion, 7*, 680-684.

McCain, B. E. (1986). Continuing investment under conditions of failure: A laboratory study of limits to escalation. *Journal of Applied Psychology, 71*, 280-284.

McClelland, D. (1961). *The achieving society.* Princeton, NJ: Van Nostrand.

Moskowitz, G. B., Li, P., & Kirk, E. R. (2004). The implicit volition model: On the preconscious regulation of temporarily adopted goals. In M. P. Zanna (Ed.),

Advances in experimental social psychology (Vol. 36, pp. 317–404). New York: Academic Press.

Northcraft, G. B., & Neale, M. A. (1986). Opportunity costs and the framing of resource allocation decisions. *Organizational Behavior and Human Decision Processes, 37*, 348-356.

Pleskac, T. J., Wallsten, T. S., & Lejuez, C. W. (2008). Development of an automatic response mode to improve the clinical utility of sequential risk-taking tasks. *Experimental and Clinical Psychopharmacology, 16*, 555-564.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers, 36*, 717-731.

Schulz-Hardt., S., Thurow-Kroning, B., & Frey, D. (2009). Preference-based escalation: A new interpretation for the responsibility effect in escalation of commitment and entrapment. *Organizational Behavior and Human Decision Processes, 108*, 175-186.

Ratneshwar. S., Warlop L., Mick, D. G., & Seeger, G. (1997). Benefits salience and consumers' selective attention to produce features. *International Journal of Research in Marketing, 14,* 245-259.

Shah, J.Y., Friedman, R., & Kruglanski, A.W. (2002). Forgetting all else: On the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology, 83*, 1261–1280.

Singer, M. S., & Singer, A. E. (1986). Individual differences and the escalation of commitment paradigm. *Journal of Social Psychology, 126,* 197-204.

Sivanathan, N., Molden, D. C., Galinsky, A. D., & Ku, G. (2008). The promise and peril of self-esteem in de-escalation of commitment. *Organizational Behavior and Human Decision Processes, 107*, 1-14.

Soman, D. (2001). The mental accounting of sunk time costs: Why time is not like money. *Journal of Behavioral Decision Making, 14*, 169-185.

Staw, B. M. (1976). Knee-deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Decision Processes, 16,* 27-44.

Staw, B. M. (1981). The escalation of commitment to a course of action. *Academy of Management Review, 6*, 577-587.

Staw, B. M., & Ross, J. (1989). Understanding behavior in escalation situations. *Science, 246*, 216–220.

Staw, B. M. (1997). The escalation of commitment: An update and appraisal. In Z. Shapira (Ed.) *Organization decision making* (pp. 191-215). New York: Cambridge University Press.

Staw, B. M., Barsade, S. G., & Koput, K. W. (1995). Escalation at the credit window: A longitudinal study of bank executives' recognition and write-off of problem loans. *Journal of Applied Psychology, 82*, 130-142.

Teger, A. I. (1980). *Too much invested to quit*. New York, NY: Pergamon Press

Thaler, R. H. (1999). Mental accounting matters. *Journal of Behavioral Decision Making, 12,* 183–206.

Thaler, R .H., & Johnson, E. J. (1990). Gambling with the house money and trying to

    break even: The effects of prior outcomes on risky choice. *Management Science,*

    36, 643-660.

Vroom, V. H. (1964). *Work and motivation.* New York: Wiley.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief

    measures of positive and negative affect: The PANAS scale. *Journal of Personality*

    and Social Psychology, 54, 1063-1070

Whyte, G. (1993). Escalating commitment in individual and group decision making: A

    prospect theory approach. *Organizational Behavior and Human Decision*

    Processes, 54, 430-455.

Whyte, G., Saks, A. M., & Hook, S. (1997). When success breeds failure: The role of

    self-efficacy in escalating commitment to a losing course of action. *Journal of*

    Organizational Behavior, 18, 415-432.

Zajonc, R.B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and*

    Social Psychology: Monograph Supplement, 9, 1–27.

Zikmund-Fisher, B. J. (2004). De-escalation after repeated negative feedback: Emergent

expectations of failure. *Journal of Behavioral Decision Making, 17*, 365-379.